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(54) OPTICAL CONVERTER SYSTEM FOR (W)LEDS

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See application file for complete search history.

(56)References Cited

U.S. PATENT DOCUMENTS

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(Continued)				

FOREIGN PATENT DOCUMENTS

DE 19638667 2/1998 DE 102005031523 A1 1/2007 (Continued)

OTHER PUBLICATIONS

English translation of International Preliminary Report on Patentability dated Feb. 17, 2011 corresponding to International Patent Application No. PCT/EP2009/003108.

(Continued)

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(57)ABSTRACT

The invention relates to an optical converter system for LEDs, preferably for so-called (W)LEDs, and a method for producing the named optical converter system. The modular-type optical converter system comprises an inorganic converter for converting the radiation emitted from the LED, an inorganic optical component, preferably comprising glass, which is disposed downstream relative to the converter in the direction of emission of the LED, wherein the converter and the first optical component are adjacent to one another and joined at least in sections. The optical converter system possesses a temperature resistance, which lies above that of the system known in the prior art. Also, the preferred components of the system are substantially resistant to UV and to chemicals.

20 Claims, 17 Drawing Sheets

